

Fig. 1
(prior Art)

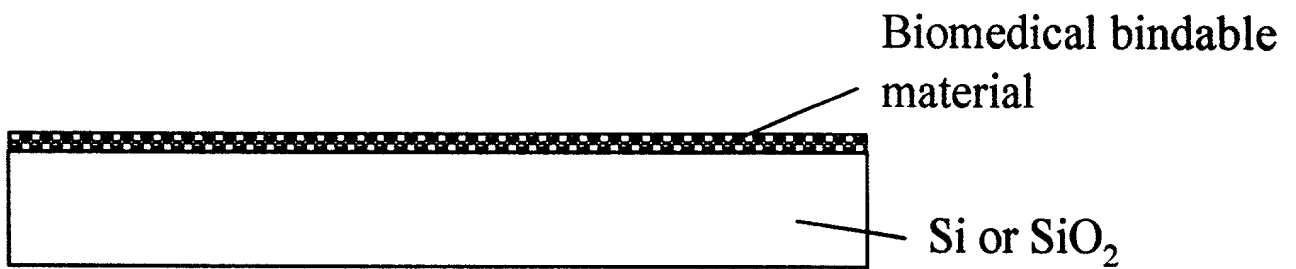


Fig. 2A-1 (prior Art)

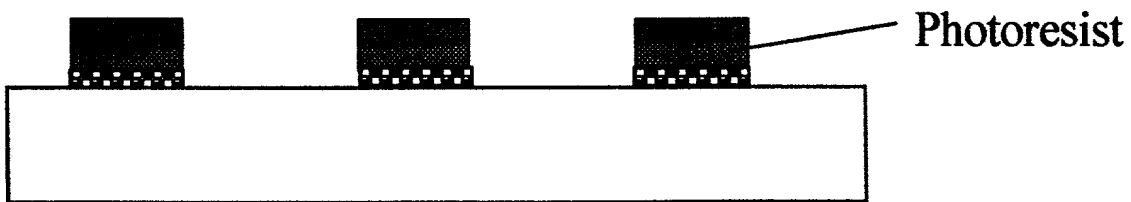


Fig. 2A-2 (prior Art)

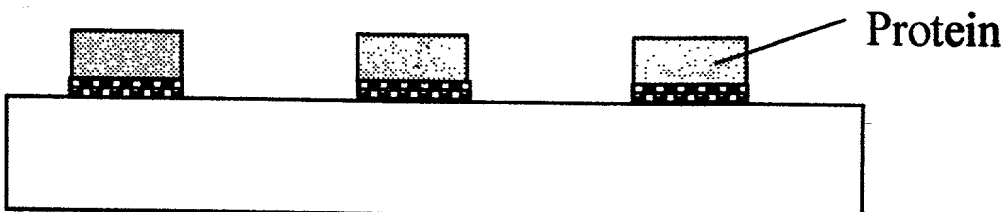


Fig. 2A-3 (prior Art)

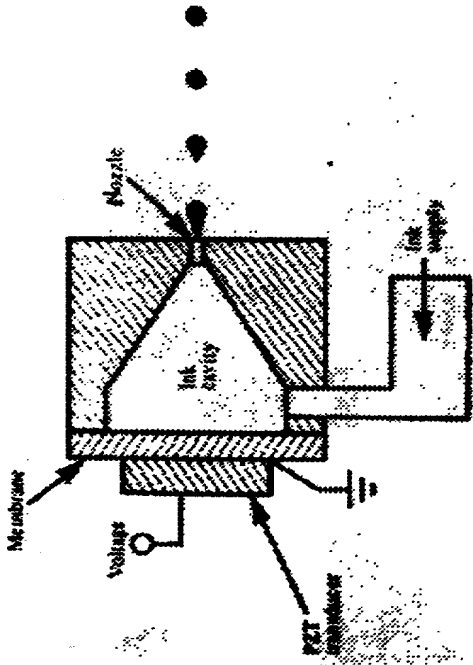


Fig. 2B-1 (prior Art)

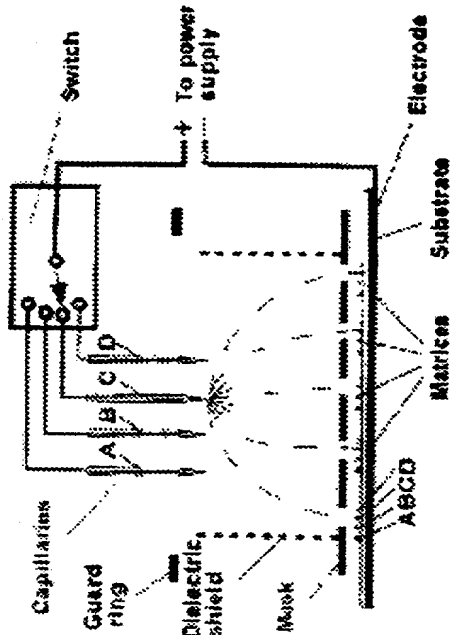


Fig. 2B-3 (prior Art)

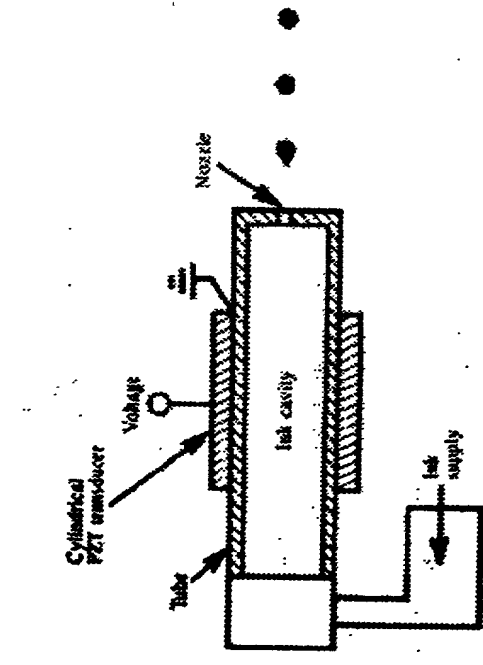


Fig. 2B-2 (prior Art)

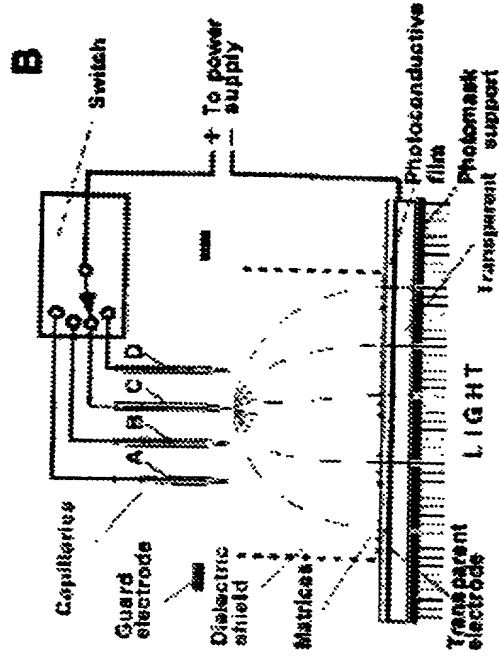


Fig. 2B-4 (prior Art)

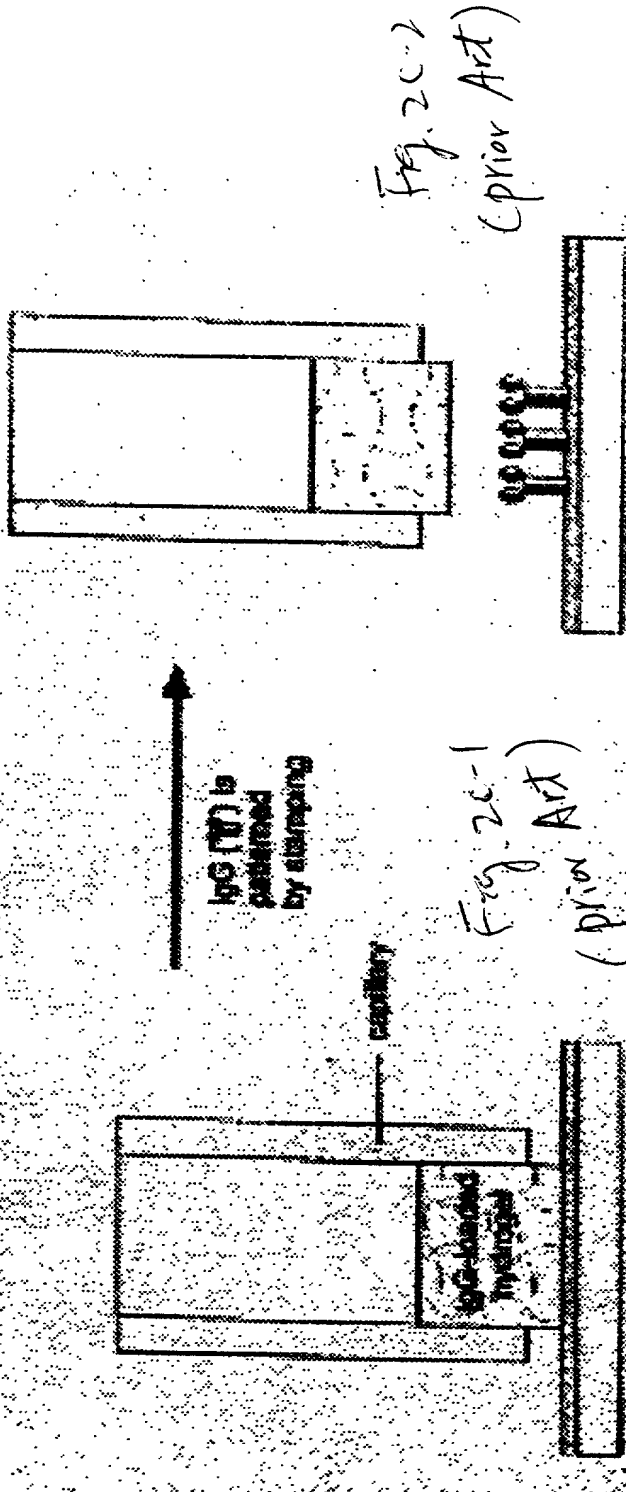
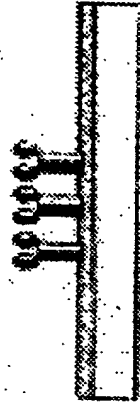


Fig. 2C-2
(prior Art)



remainder of
surface is blocked
with BSA (BSA)

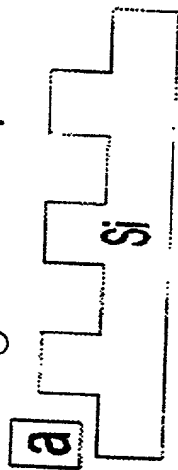
Fig. 2C-4
(prior Art)

Fluorescence-
labeled antigen
(---) is
introduced

Fig. 2C-3
(prior Art)



Fig. 2D-a (prior Art)



uChs, Fig. 2D-b (prior Art)

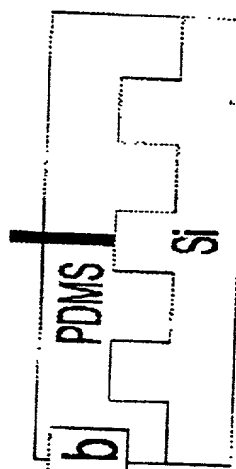


Fig. 2D-C (Prior Art)

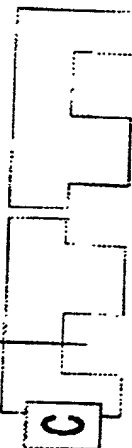


Fig. 2D-D (prior Art)

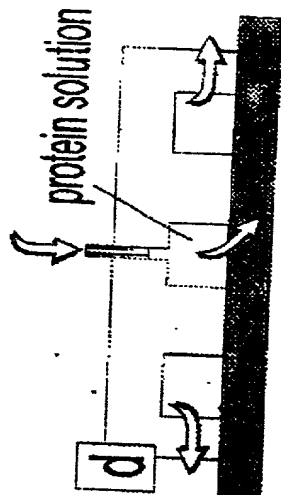


Fig. 2D-e (prior Art)

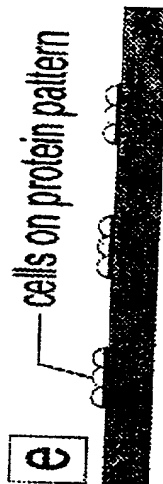


Fig. 2E-1
(Prior Art)

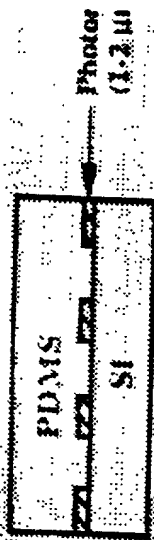


Fig. 2E-2
(Prior Art)



Fig. 2E-3
(prior Art)

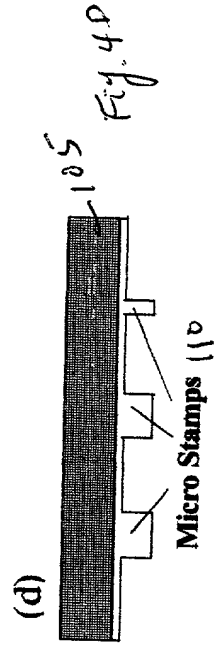
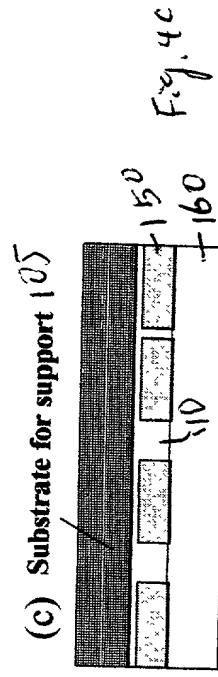
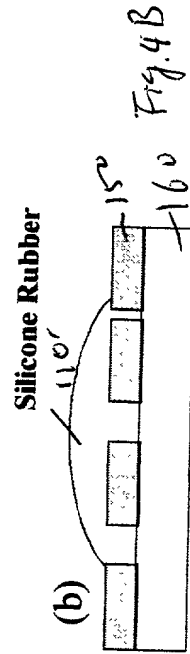
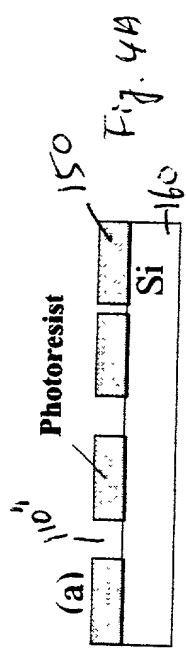
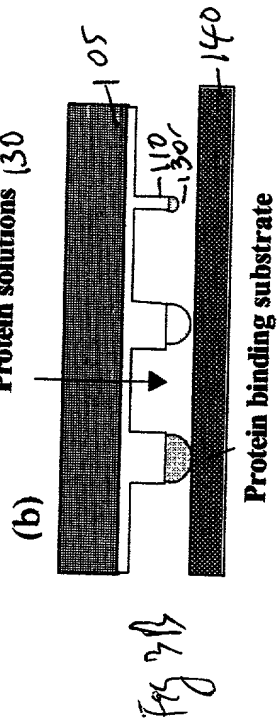
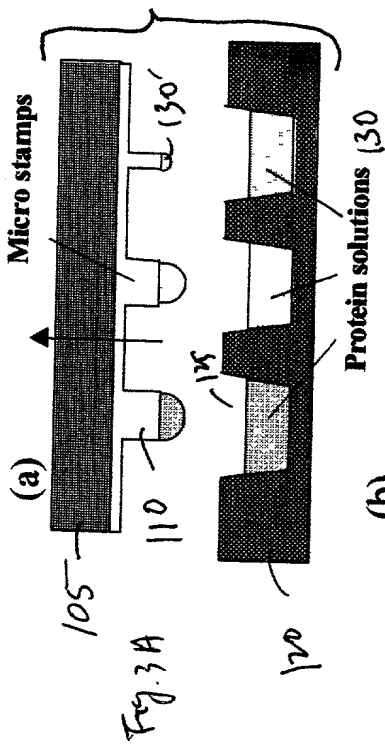


Fig. 2E-4
(prior Art)



Fig. 2E-5
(Prior Art)





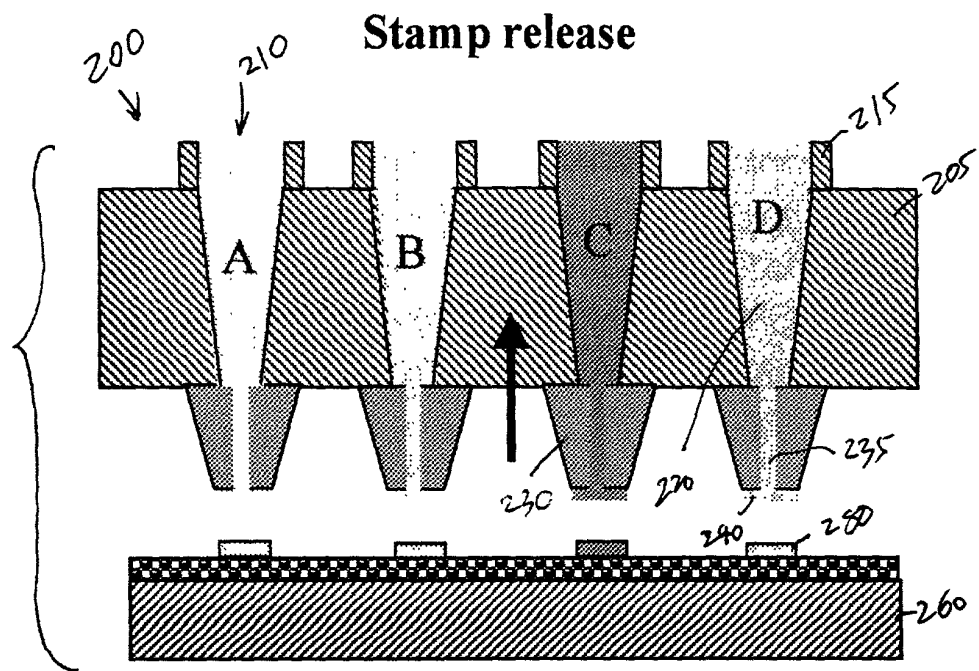


Fig. 5

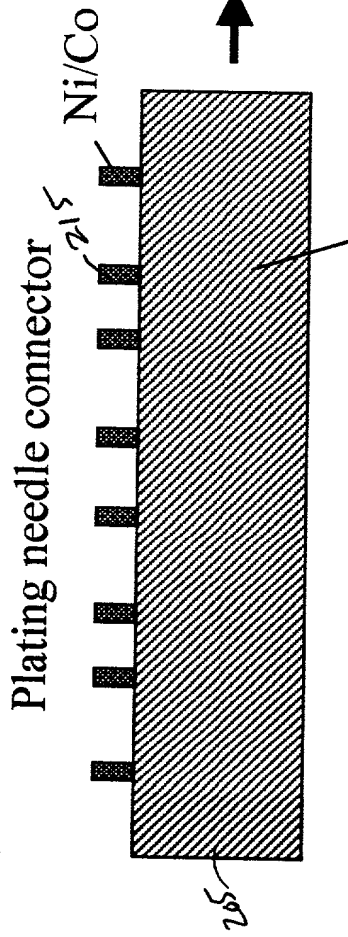


Fig. 6A

Molding Silicone rubber Stamp

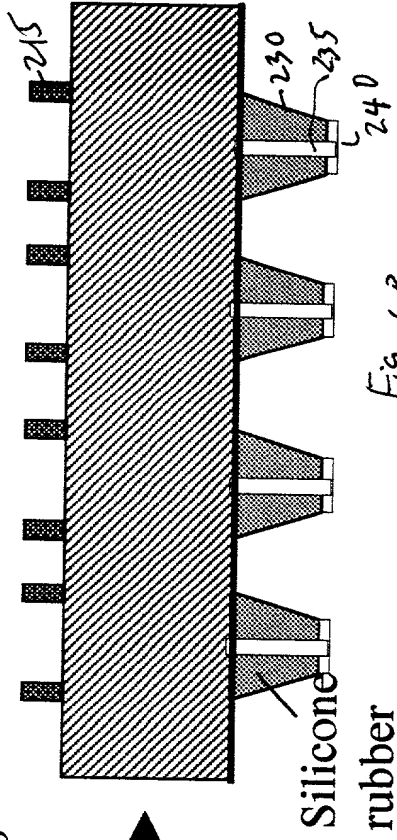


Fig. 6B

Remove silicone rubber residue to open channel/stamp connection

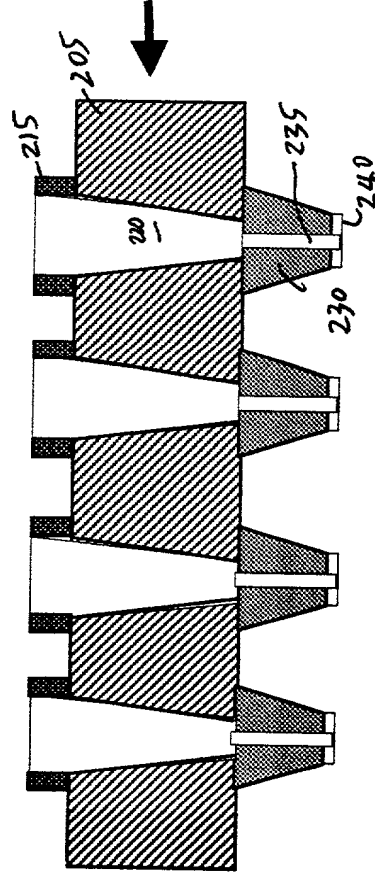


Fig. 6D

Deep RIE/wet etching fluid channel

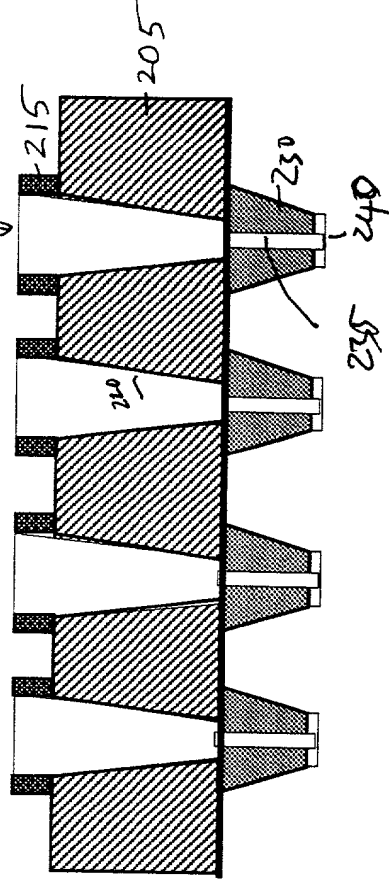


Fig. 6C

Wet etching Glass substrate

To make primary and micro channel

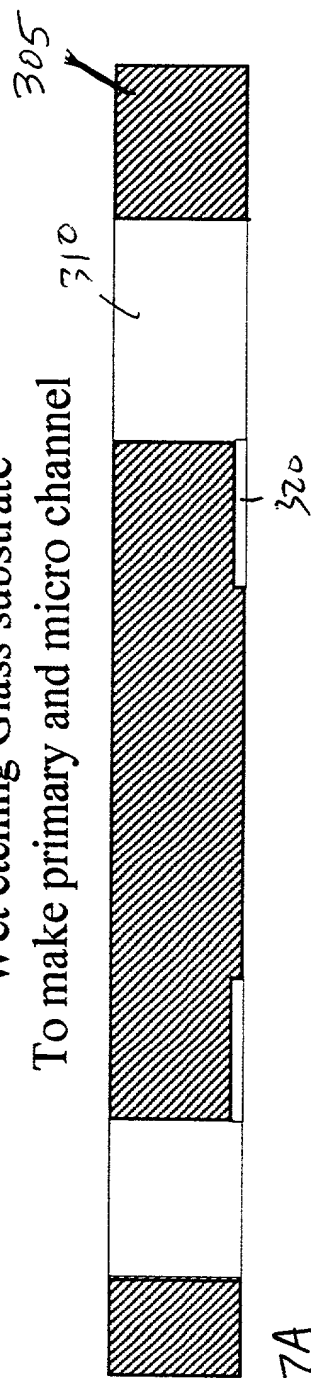


Fig. 7A

Silicone rubber molding silicon substrate

Deep RIE secondary reservoir

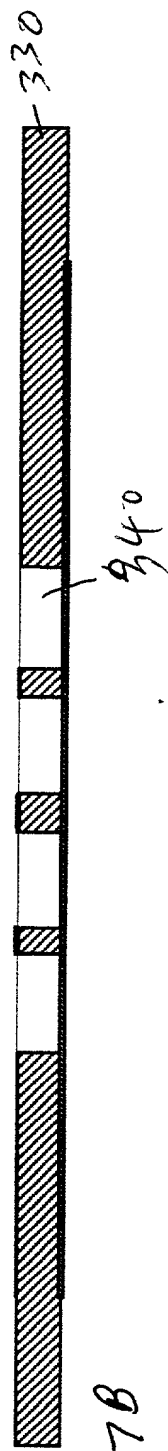


Fig. 7B

Wafer bonding

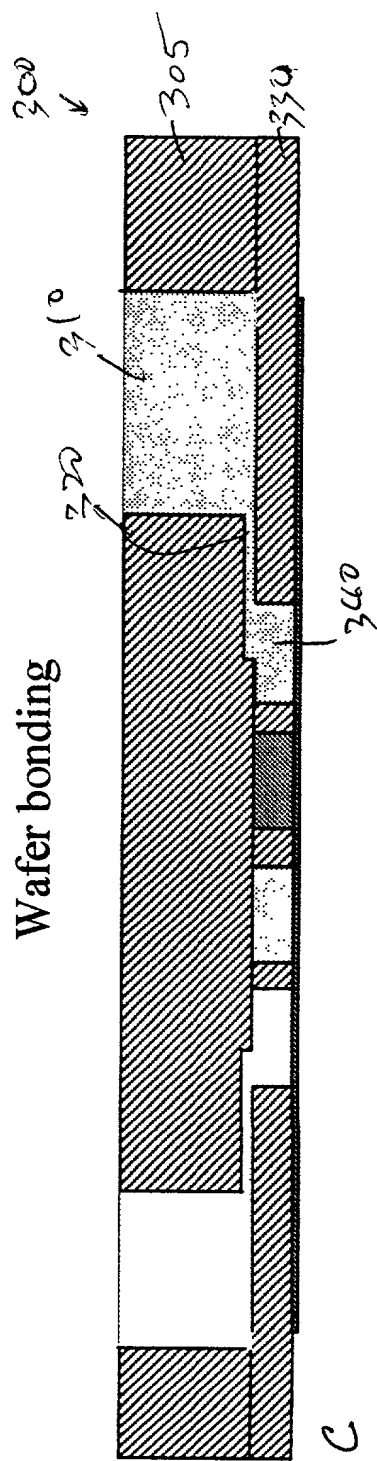
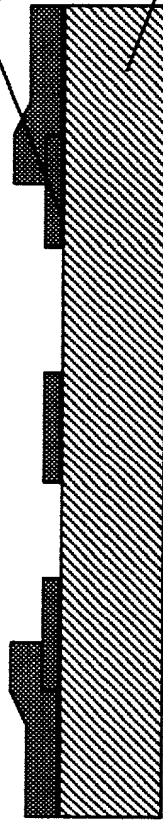


Fig. 7C

Electrode, sensor, heater 310

Fig. 8A

Si, SiO₂
305

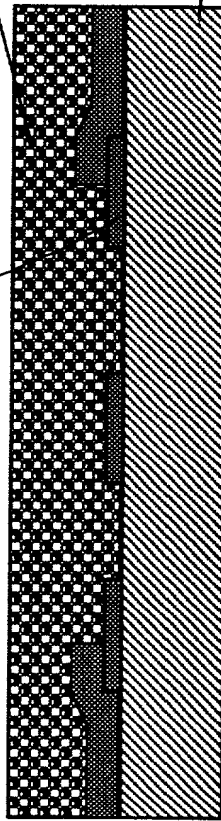


310

Bio bindable material
(SiO₂, PVDF, Nylon..)
Or Bio gel. 320

Fig. 8B

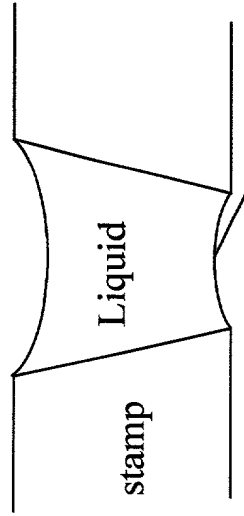
305



New design concepts

A. Liquid filling into stamp

- (1) hydrophilic surface inside channel (easy to fill in, but the bottom meniscus of liquid is concave upward which is not desired)



Not easy to contact with reaction substrate

Fig. 9A

- (3) hybrid surface inside channel

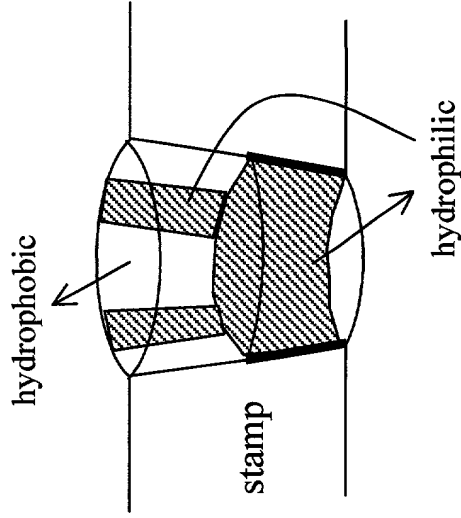
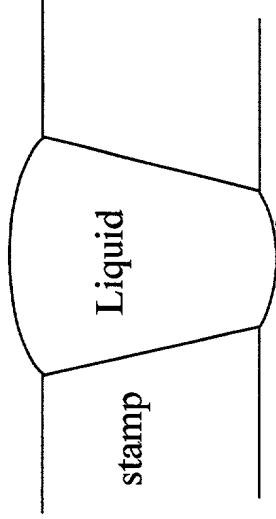


Fig. 9C

- (2) hydrophobic surface inside channel (liquid hard to fill in, however, the bottom meniscus of liquid is what we need; concave downward)



Easy to contact with reaction substrate

Fig. 9B

- partial hydrophilic and hydrophobic surface as the left side; or the surface can be switched into hydrophilic or hydrophobic as desired

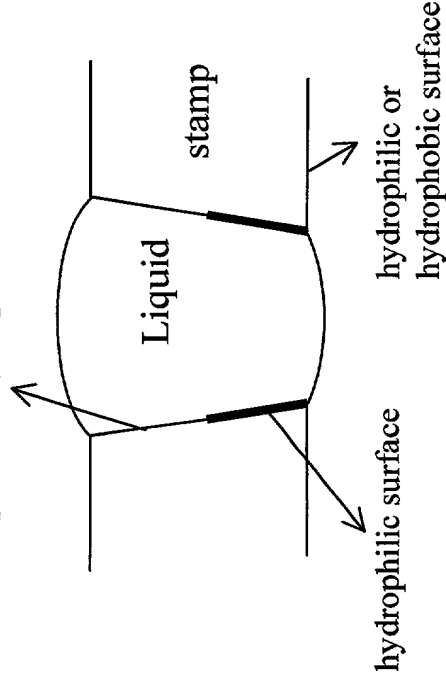
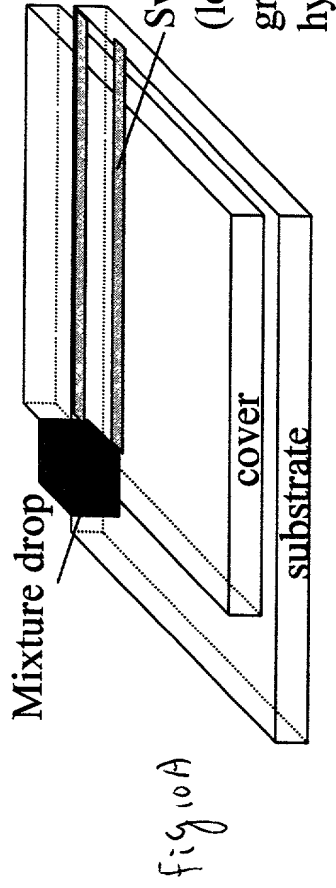


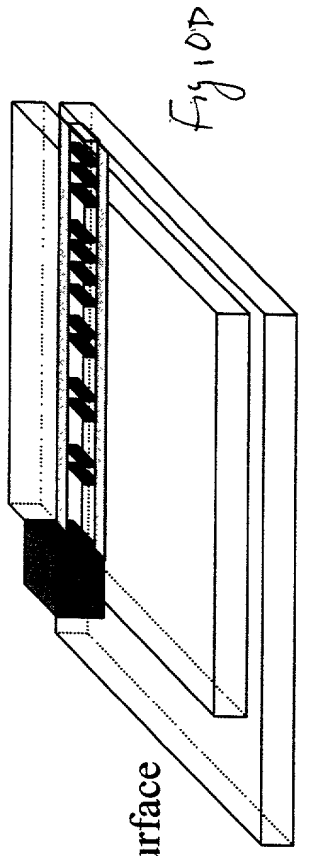
Fig. 9D

New idea: 2 D micro Separation

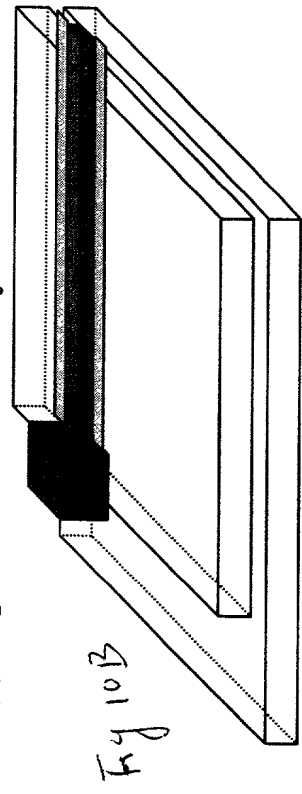
(a) Blood or bio-reagent mixture drop



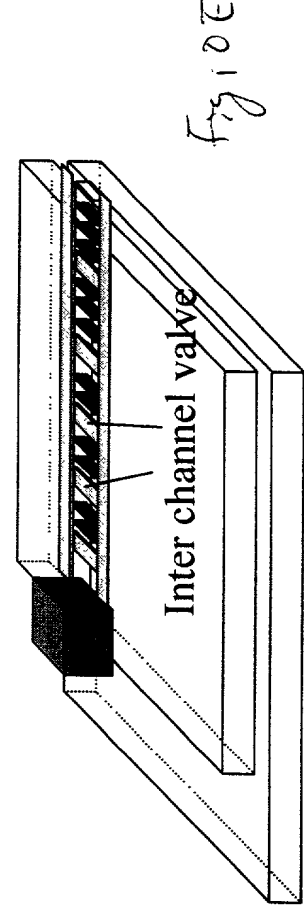
(d) Proteins, DNA... coarse separation by capillary electrophoresis



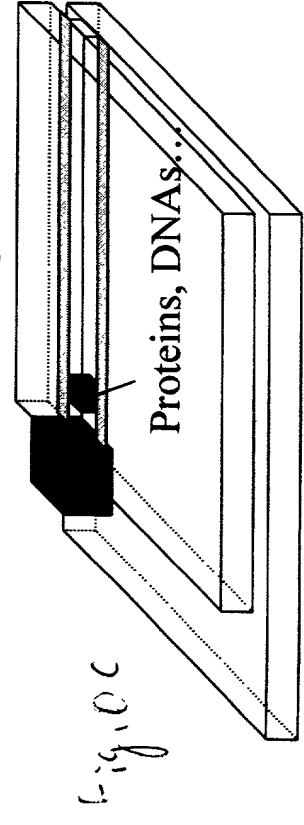
(b) Liquid mixture fill in by surface tension



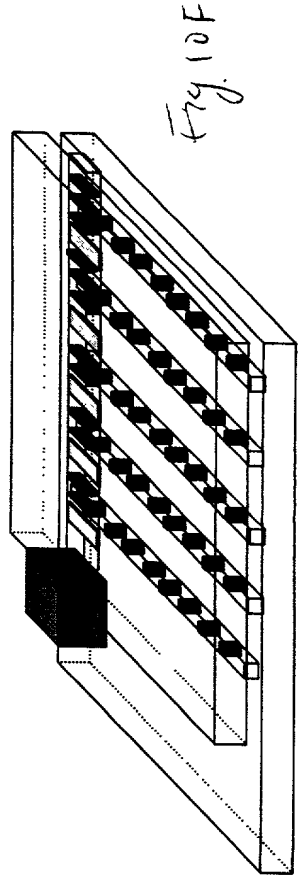
(e) Mixture droplet separation



(c) Proteins, DNA, or bio-reagent focus



(f) Liquid fill into vertical channels and Fine separation by capillary electrophoresis



Micro protein arrays
on chip surface

(a). Dry off and take
out the cover

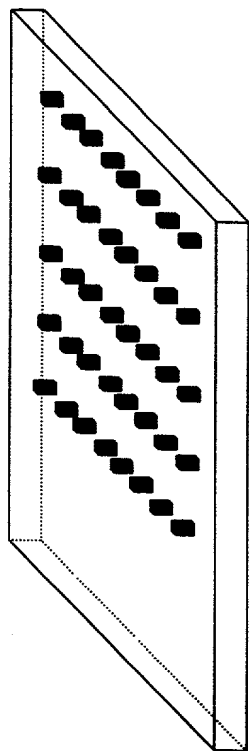


Fig 11 B

For direct analysis

Micro protein arrays
inside micro chambers

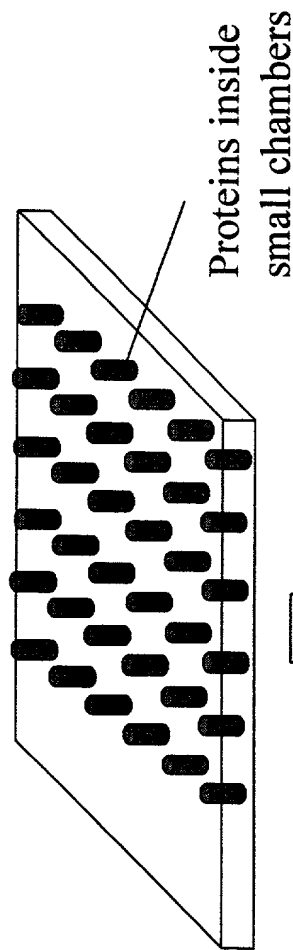
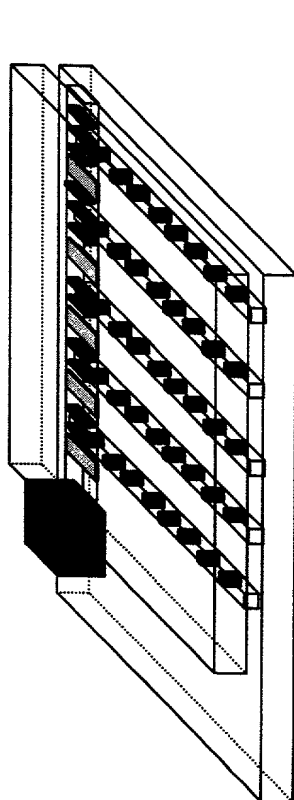


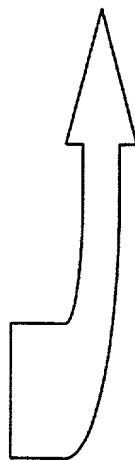
Fig 11 C

Directly connected to micro stamp
for microfilling process
(pitch is exactly the same as on the stamp)

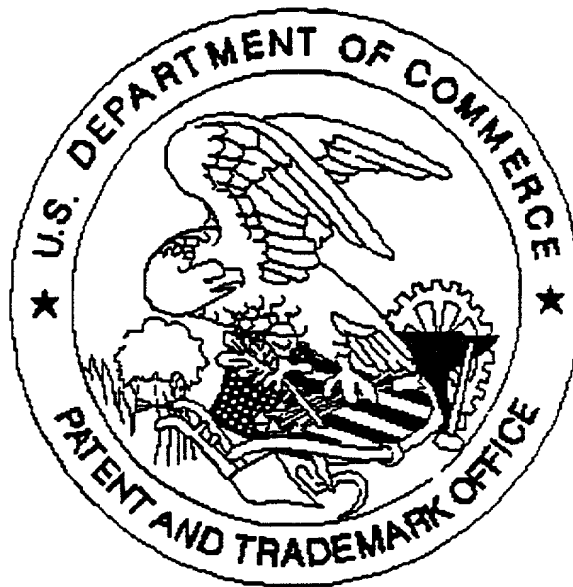
Fig 11 A



(b). Suck into
micro chambers



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